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(54) Plant for the production and distribution of the rubber coated metallic rings with filler to the assembling unit of the tyres

(57) The plant is characterised by a unit 1 that automatically applies the filler to the rubber coated metallic rings and by an apparatus 9 that automatically feeds the rubber coated metallic rings and that takes back the

metallic rings once the filler has been applied on them.

Same apparatus 9 transfers the rings with filler to the unit 11, which feeds the assembling unit of the tyres.

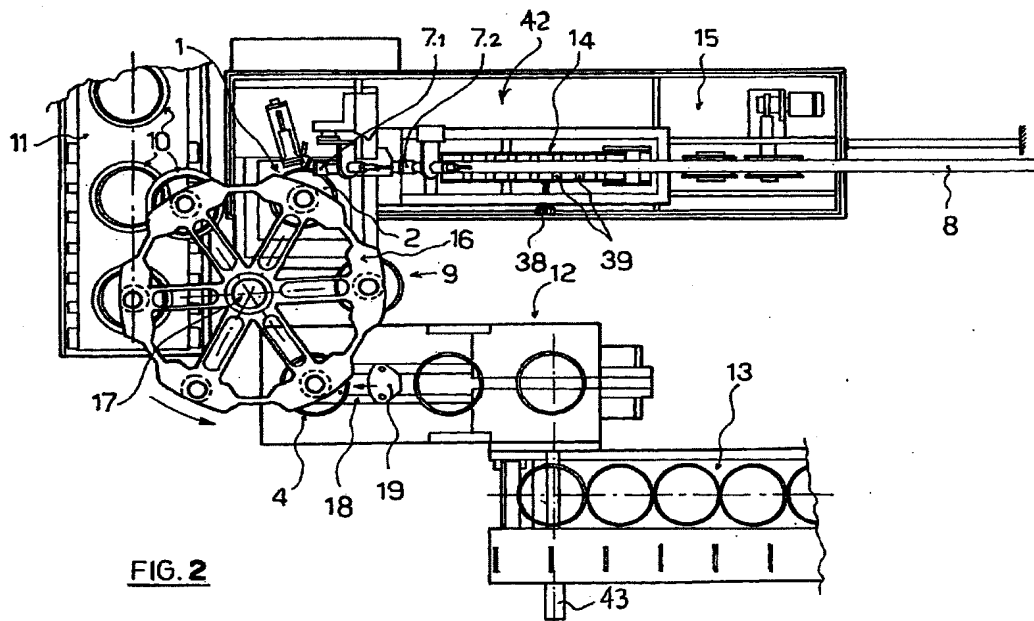


FIG. 2

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## Description

[0001] The invention consists in a plant for the application of a rubber filler to the rubber coated metallic rings which are inserted in the tyre bead.

[0002] In order to simplify the application of the rubber filler to the rings which are inserted in the tyre bead machines which automatically provide to said operation have been realised.

[0003] Such plants present anyway some drawbacks due to the fact that it's impossible to eliminate the operators who feed the machine with metallic rings and in a second time transfer the rings with filler to the machine which inserts them in the tyres.

[0004] Furthermore, the displacement of the rubber strip of the filler presents many drawbacks, such as its difficult positioning in the machine which should applied it, and some problems connected to its cooling after it has been extruded.

[0005] At this end, the invention solves the problem of the feeding of the rings to the machine having to apply the filler and of the means necessary for their transfer to the unit which has to provide to the insertion in the tyres.

[0006] The plant is described in details here below, with reference to the figures of the six enclosed schemes which respectively illustrate:

Fig. 1: Schema in blocks of the plant

Fig. 2: General view of the plant

Fig. 3: schematic side view of the unit for application of rubber strip to metallic rings with device supplying and transferring metallic rings with filler to the plant that assembles tyres

Fig. 4: schematic side view of the unit for application of rubber strip to metallic rings with device distributing metallic rings and transferring metallic rings with fillers

Fig. 5: side view of the stretcher group of the rubber strip

Fig. 6: side view of the cooling unit

[0007] The plant is constituted by several working units feeding a central unit 1 which applies the rubber strip to the rubber coated metallic rings 4. More particularly, it's made by means of the combination of the following parts:

- a) a unit 12 for collecting and supplying rubber coated metallic rings;
- b) an apparatus 9 distributing metallic rings to unit 1 and transferring metallic rings with filler from unit 1 to unit 11;
- c) the units 41, 40 and 28 furnishing the rubber strip to unit 1 after having produced it;
- d) a central unit 1 applying rubber strip furnished by units 41, 40 and 28 to the rubber coated metallic rings;

e) a unit 11 for transferring the rings with filler to the plant that assembles tyres.

[0008] The unit 41 consists in an extruder 41 that feeds the unit 40 including a calander with the raw strip constituting the rubber strip, from which, by means of a shrinkage conveyor, the strip is moved on to a balance, provided with a camera 33, that controls its weight.

[0009] Afterwards, the strip is transferred in a cooling unit 28 in which it moves without being subject to abnormal stress to feed an equipment that provides for the storage of the rubber strip and for the feeding of the central unit 1.

[0010] The rubber strip that goes to the central unit 1 to be applied on the rubber coated metallic ring is stretched in order to facilitate the application to the metallic ring.

[0011] The unit 1 is constituted in details by a circular rotating plate 2 on which is applied a device 3 for the rotation of the plate; the rubber coated metallic ring is mounted on the circular rotating plate, concentrically to it and locked by means of the expansion of same circular rotating plate.

[0012] By means of the transport pincer 21, the rubber strip is superimposed on the metallic ring after having received the heading cut while it's locked by the heading pincer 35.

[0013] The extremity of the rubber strip is locked by the heading pincer 35 on the circular rotating plate in contact with the metallic ring 4.

[0014] During the rotation, the pressing device 6.1 moved by piston 6 causes the sticking of the filler to the metallic ring; in a second time, by a cutter 7.1 moved by piston 7, after the locking with transport pincer 21, the posterior extremity of the filler is cut and by means of the pincer 5, said posterior extremity of the filler is put in contact with the metallic ring and with the heading of the filler.

[0015] With an ulterior rotation of the circular rotating plate, the sticking of the final portion of the filler is effectuated.

[0016] Metallic rings 4 are picked up by electromagnetic devices 16 mounted on an apparatus 9 after having been collected one by one by a hooking device 19 moved by a belting 18 placed under the same apparatus 9.

[0017] Apparatus 9 collects the metallic rings exploiting their magnetism, and rotating around a vertical support 17, transports them until they are superimposed to the circular rotating plate 2.

[0018] After the application of the rubber strip 8, the apparatus 9 sucks electromagnetically by means of the above-mentioned devices 16 the metallic rings with filler 10 from the circular rotating plate 2 and, with an ulterior rotation around the rotating central support 17, transports them on a belting 11 which moves them to the assembling line of the tyres.

[0019] Each time the rotating apparatus 9 releases

a metallic ring on the circular rotating plate 2, it collects a metallic ring from unit 12.

[0020] In the embodiment of figure 2, the apparatus 9 is provided with six electromagnetic devices 16 so, each time it rotates of 60°, it lifts a metallic ring from unit 12 and releases a metallic ring on the circular plate 2.

[0021] The apparatus stops during the time necessary for the application of the filler on the metallic ring, afterwards it sucks the metallic ring with filler and with an anti-clockwise rotation, it releases the metallic ring with filler on the belting 11.

[0022] Unit 13 transports the piles of metallic rings in such a position that they can be moved by a piston 43 on unit 12 on which, by further means, the pile of metallic rings is moved on the belting 18 which provides by the hooking device 19 to hook a single metallic ring per time and to move it under one of the electromagnetic devices 16 which lifts it and transports it on the circular rotating plate 2.

[0023] The rubber strip 8, before arriving to the circular plate 2, slides on a device 14 in order to be rightly positioned during the feeding of the circular plate.

[0024] Said feeding is effectuated by the transport pincer 21 which is moved by piston 20.

[0025] Device 14 is connected to a stretcher group 15 which gives the right stress to the strip by a stretching roller 24 connected to an arm 23, which is balanced by a counterweight 22.

[0026] The rubber strip is supplied by the feeding apparatus 25 that includes an arm 26 of the feeding roller 27.

[0027] In the cooling unit 28 are mounted some motors 29 which cause the rotation of rollers 31, said rollers providing to give the right stress to the rubber strip and a sufficient time of permanence in said cooling unit, causing its elongation when necessary.

[0028] At this end, in the cooling unit 28 are mounted photocells 30 that cause a variation of the speed of motors 29 applied on rollers 31, according to the position of the rubber strip (3 photocells per each vertical support).

[0029] The strip coming from stretcher 34 passes under a control camera 33 as previously mentioned; the air conditioning unit 32 provides to maintain a right degree of humidity and temperature in the cooling unit.

[0030] The positioning of the roller 39 for the sliding of the rubber strip is effectuated by means of a horizontal setting hand grip 38 and of a vertical setting hand grip 37 mounted on a mobile frame 36, which form the apparatus 42.

[0031] The plant can also be realised in different embodiments but including the basic units in order to permit its working, i.e. unit 1 which applies the filler, unit 9 which furnish the rubber coated metallic ring to unit 1 and transfers the rings with filler to unit 11, which at its turn transfers them to the assembling line of the tyres, unit 12 which collects and supplies rubber coated metallic rings and units 28, 40 and 41.

## Claims

1. "Plant for the production and distribution of rubber coated metallic rings with filler to the assembling unit of the tyres" including a unit (1) for automatically applying the rubber strip to form the filler and means to feed said unit, characterised by the fact that the unit (1) is fed by an apparatus (9) furnishing the rubber coated metallic rings and by the fact that the same apparatus (9) takes back the metallic rings with filler from the unit (1) after they've been manufactured and transfers them to a unit (11) which transfers the rings with filler to the assembling unit of the tyres.
2. Plant as claimed in claim 1, characterised in that the apparatus (9) is an electromagnetic type apparatus and consists in a circular apparatus on which are mounted some electromagnetic devices (16) at the extremity of radial elements that form between them an angle of for example 60°, to permit the suction of the rubber coated metallic rings, exploiting their magnetism, from a unit (12) that furnishes said rings to said apparatus (9), that releases them on the circular rotating plate (2) mounted on the unit (1) that applies the rubber strip to the metallic rings and by the fact that, once the filler has been applied, the apparatus (9) takes back the metallic rings with filler and rotating in an anticlockwise direction transports and releases them on a device (11) that, at its turn, transports the rings with filler to the assembling unit of the tyres.
3. Plant as claimed in claim 1, characterised by the fact that the unit (1) forming metallic rings with filler is fed by an apparatus (42) which insures the right horizontal and vertical positioning of the rubber strip by means of horizontal and vertical hand grips ((38) and (37) respectively) and by the fact that said apparatus (42) is fed by a stretcher group (15) and a feeding apparatus (25) to insure the right stretching of the rubber strip (8) for the continuity of the feeding; the apparatus (15) and (25) being provided with arms (23) and (26) with rollers (24) and (27), the arm (23) being reactioned by a counterweight (22) to give the right stress to the rubber strip (8).
4. Plant as claimed in claim 1 characterised by the fact that the unit (12) collecting metallic rings is connected to a part (13) on which are stocked piles of rubber coated metallic rings that are moved to be settled in a position in which, by a piston (43), they are moved on unit (12), on which, by the means of a hooking device (19) that slides under the piles of metallic rings, the lowest ring of each pile is transferred under of the electromagnetic devices (16) of the apparatus (9) said device (16) lifting the ring and transferring it on the circular rotating plate (2) of

unit (1) that provides to apply the filler.

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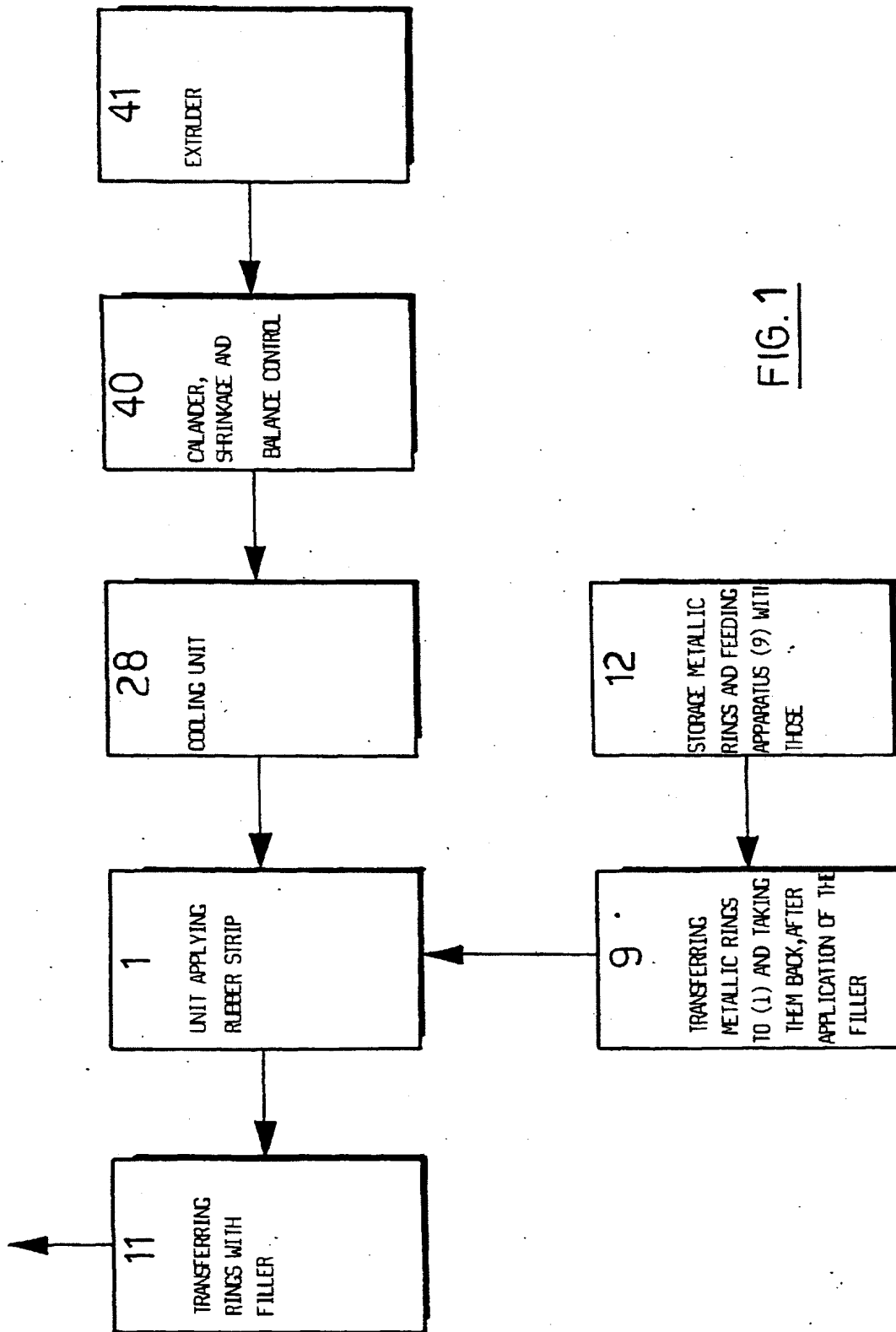
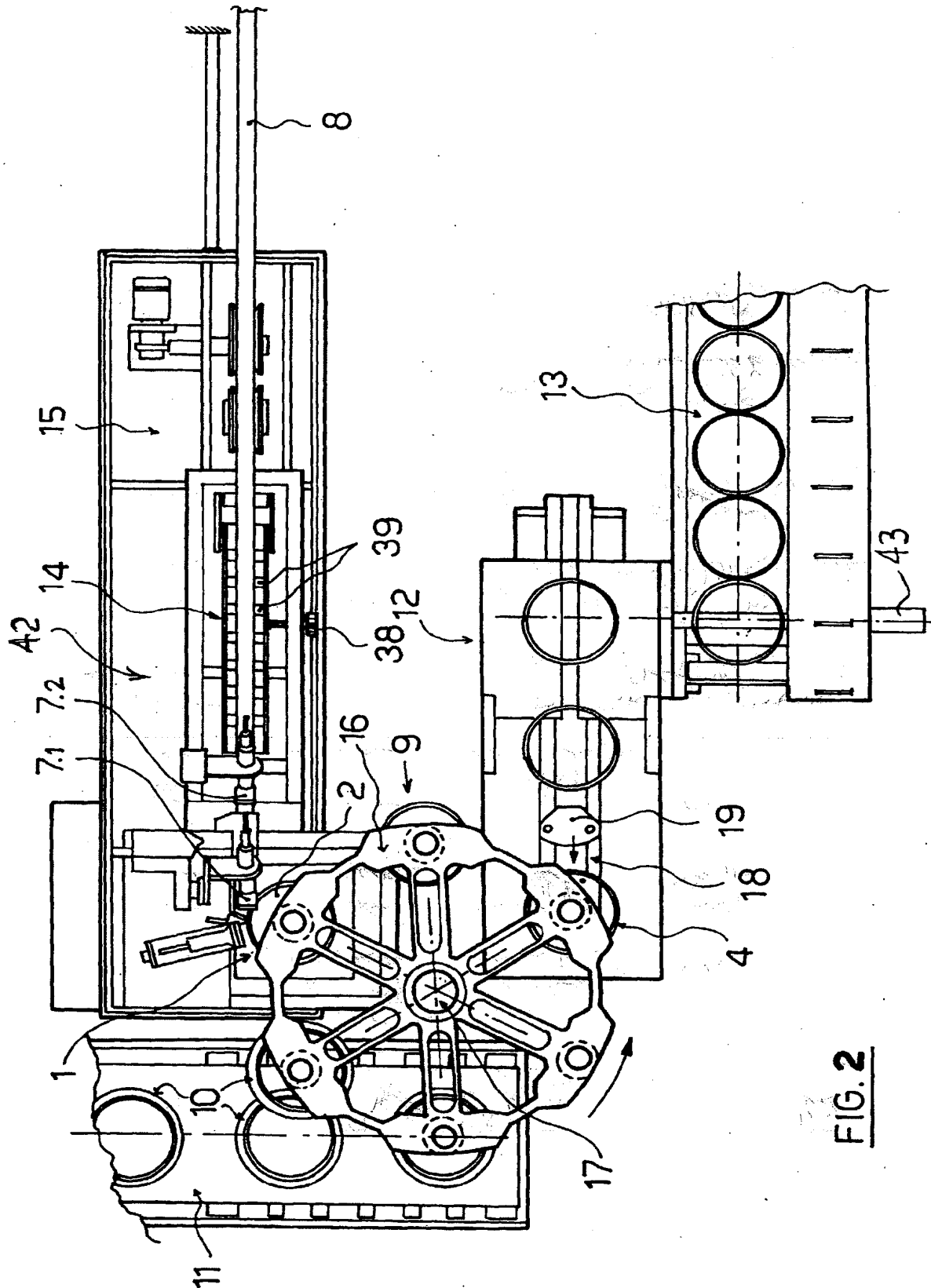
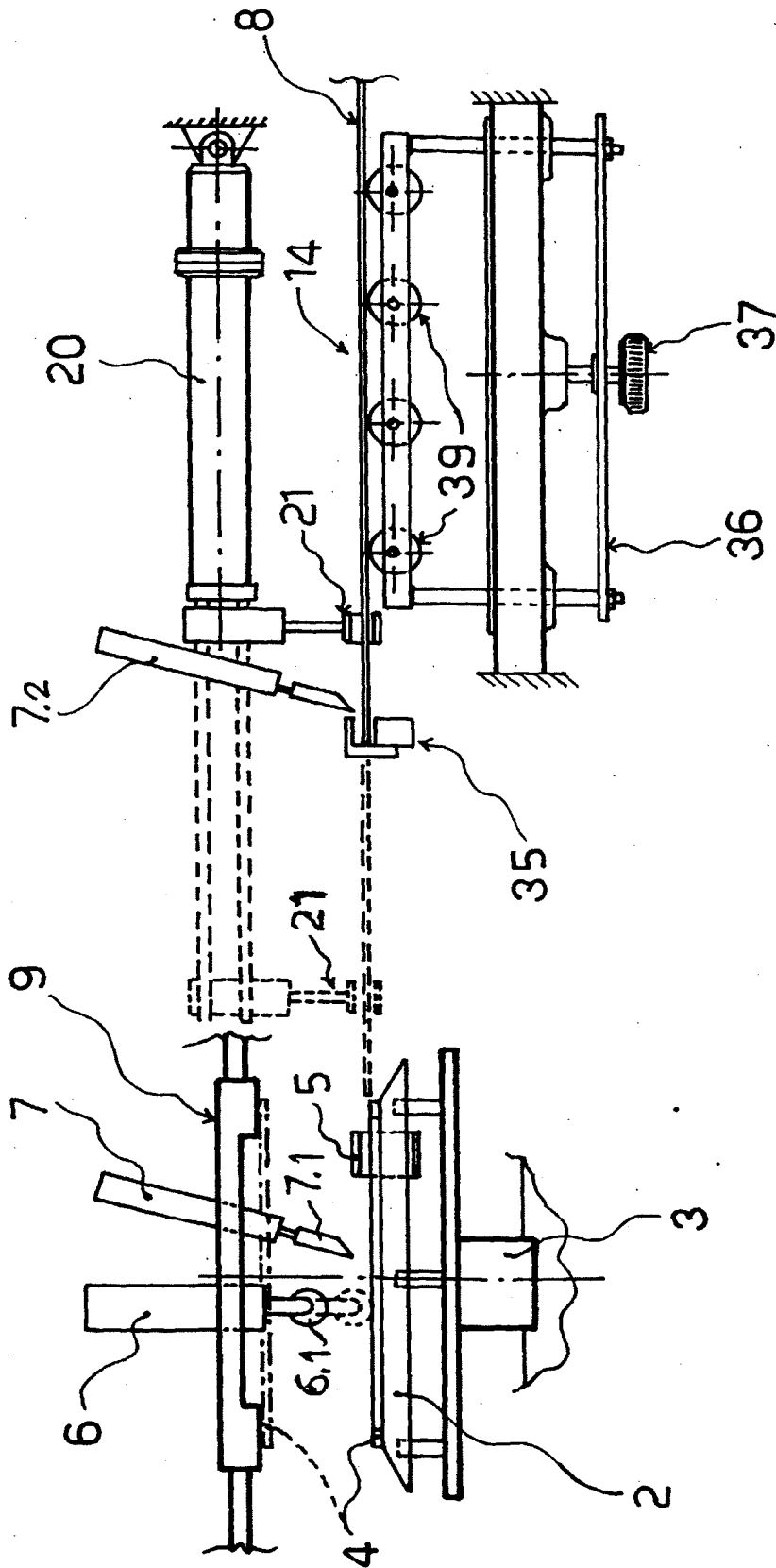


FIG. 1





**FIG. 3**

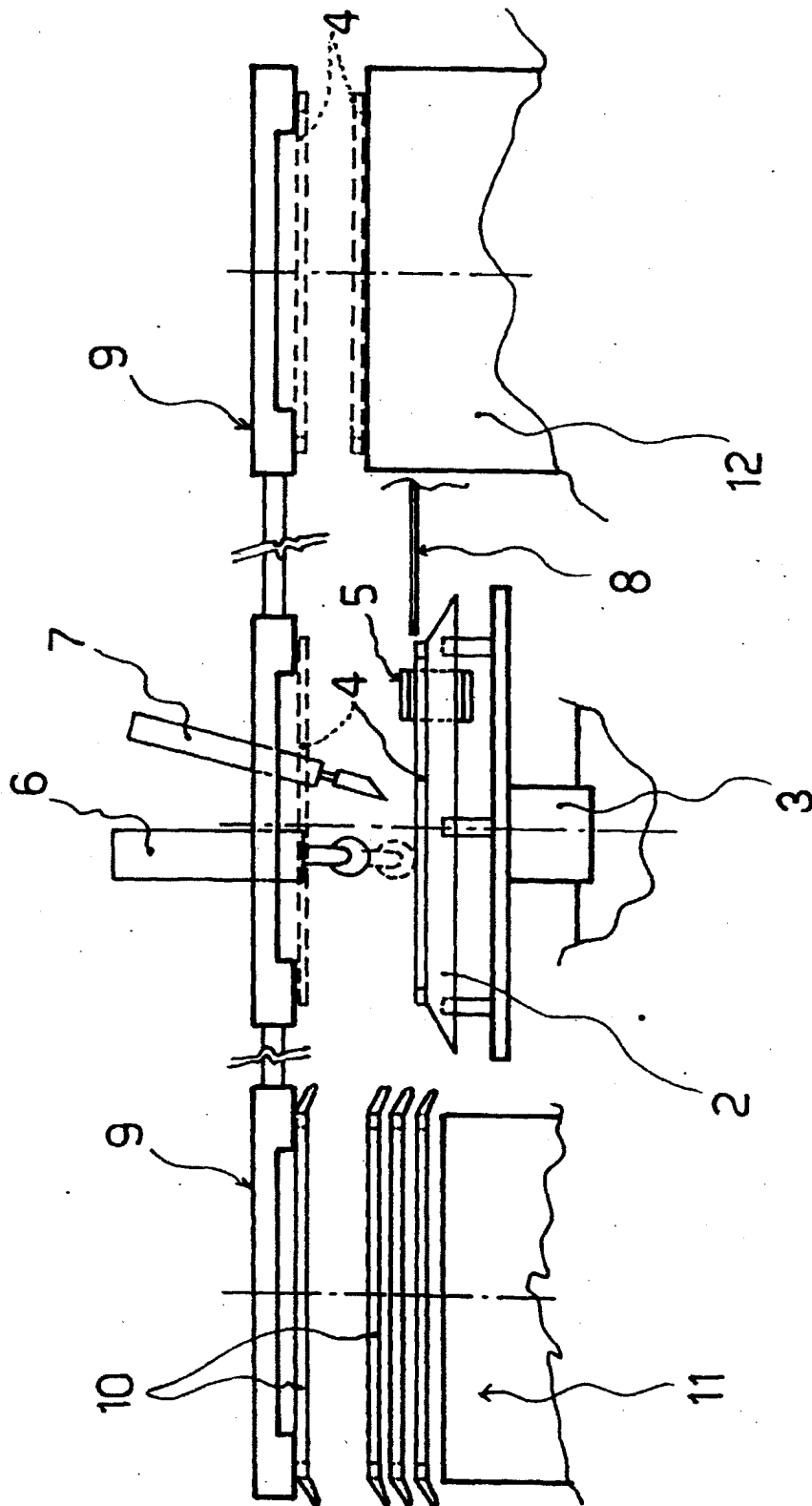
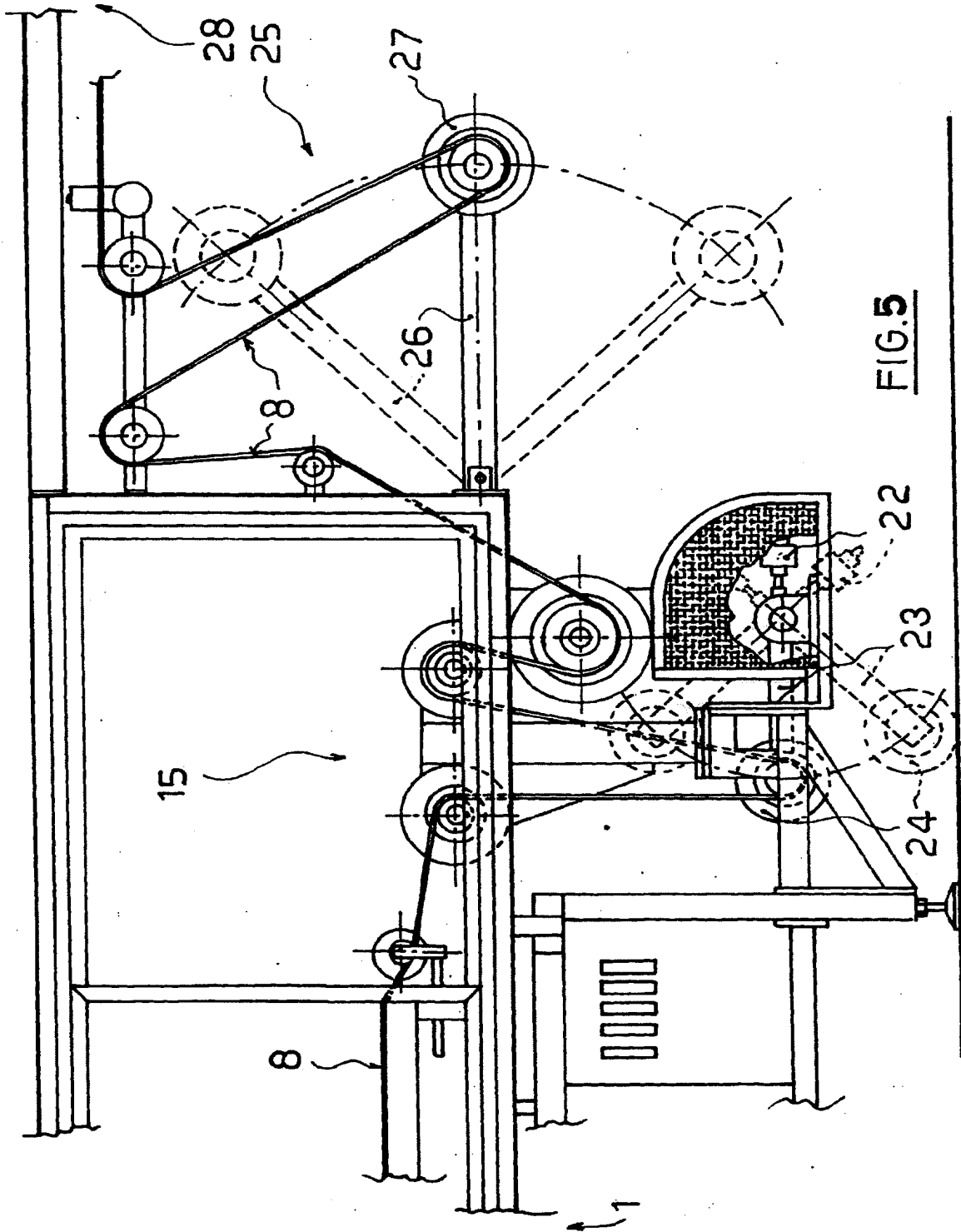


FIG. 4





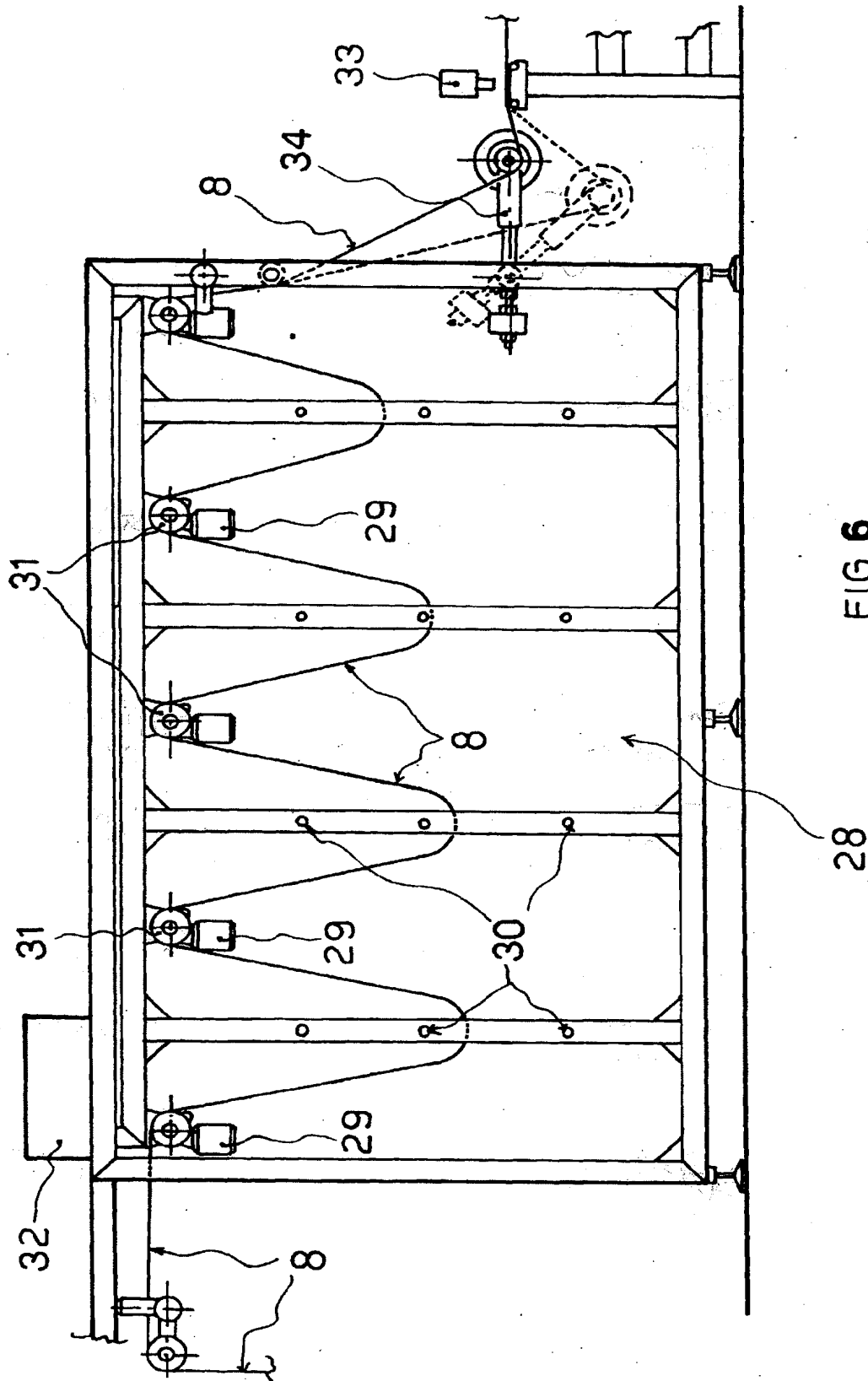


FIG. 6



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## EUROPEAN SEARCH REPORT

Application Number  
EP 98 12 1746

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
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A	US 5 336 358 A (KAWAGUCHI KATUHIDE ET AL) 9 August 1994 * column 3, line 41 - column 4, line 5; figure 1 * * column 9, line 10 - column 11, line 55 *	1-4	
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B29D
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>15 April 1999</b>	Examiner <b>Fregosi, A</b>
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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
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